

Earth's Inner Core is Relatively Young

Cross-Curricular Connections, Q

Directions: The *Science News* article "[Earth's inner core is relatively young](#)" explores how a change in the Earth's inner structure created the relatively strong magnetic field that exists today. The concepts below all relate to the geodynamo, which sustains this magnetic field. Follow your teacher's instructions to draw a diagram that explains one of the concepts. Be as detailed as possible and label your diagram appropriately.

Concepts:

Creation of a magnetic field

Thermal convection (include the concept of density)

Heat conduction (include the concept of thermal equilibrium)

Crystallization (include the concept of heat transfer and use water as an example)

Earth's inner structure (include composition and approximate depth ranges)

Class discussion:

1. How do the individual diagrams inform the larger geodynamo process, as it is described in the article? How does Earth's core generate a magnetic field? Draw a diagram of the geodynamo as a class, using group diagrams to inform the larger diagram. Discuss how energy flows and transforms throughout the geodynamo process.

2. Explain why the geodynamo is considered to be self-sustaining. Why do you think geophysicist Peter Olson says "all planets lose heat"? How would you represent the general energy flow between Earth and space? Will the geodynamo effect last forever?

3. How does life on Earth benefit from the magnetic field and thus the geodynamo? What technologies depend on the field? What could happen to life and these systems if the field weakens or changes?